

How to read clinical journals:

I. Why to read them and how to start reading them critically

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This series of Clinical Epidemiology Rounds has been prepared for those clinicians who are behind in their clinical reading. As nearly as we can tell from several informal polls, this includes all of us. And well it should. To keep up with the 10 leading journals in internal medicine a clinician must read 200 articles and 70 editorials per month.¹ There are now over 20 000 different biomedical journals published (up from 14 000 10 years ago); to "read up" on viral hepatitis requires selection from among 16 000 citations published on this topic in English alone in the last 10 years.

The biomedical literature is expanding at a compound rate of 6% to 7% per year;² thus, it doubles every 10 to 15 years and increases 10-fold every 35 to 50 years. By contrast, our time available for reading the clinical literature is constantly being whittled away by other demands. Accordingly, our recommendations in this set of rounds will stress efficiency as well as validity and applicability, and many of our prescriptions for the busy clinical reader will call for tossing an article aside early rather than devoting time to its detailed study, only to reject it later. Thus, the guidelines we propose will permit clinicians to rapidly separate the "wheat from the chaff" in the clinical

literature so that their clinical skills can be sharpened rather than smothered by reports of innovations in diagnosis, prognosis and therapy.

We confront a given article in two ways. First, it can find us, as a result of our subscribing to its parent journal or because somebody gave it to us. Second, we can find it, as a result of trying to track down information that will help us make a diagnosis or manage a particular patient. Both routes reflect our priority for keeping up with developments in medicine, the necessity for which is underscored in the following presentation:

In 1973, 230 hypertensive men were identified at a steel mill in Hamilton, Ont. When their diastolic blood pressures remained at 95 mm Hg or higher after 3 months of observation, they underwent a thorough history, physical and laboratory work-up. Then each hypertensive man, plus a record of his work-up, was linked to a clinician who decided whether and how to treat him.³

Two thirds of these men were started on drug therapy and one third remained untreated, making it possible for us to go back and identify three major determinants of this clinical decision to treat some but not other hypertensive patients. The first two determinants were the level of diastolic blood pressure (the men with more severe hypertension were more likely to be treated) and the presence of target organ damage (those with evidence of damage to the heart, brain, kidney, eye or major arteries

were more likely to be treated), both of which are logical and appropriate.

However, the third determinant of whether a hypertensive man was started on treatment was the year of graduation from medical school of the physician to whom he was referred; the more recent graduates were more likely to treat. Indeed, it appeared that these physicians, both older and younger, were practising the sort of medicine that prevailed at the time they finished their training. They had been taught the appropriate contemporaneous management of hypertension but often appeared not to have been taught how to decide when to change this management.

This presentation dramatizes a continuing challenge to the practice of medicine: the necessity (if we are to continue to do more good than harm to our patients) to recognize and respond to the need to change our diagnostic and therapeutic maneuvers so that they remain consistent with valid new knowledge.

The issue is a fundamental one and extends far beyond hypertension. For example, should we still automatically use clofibrate in treating asymptomatic middle-aged men who have moderate hypercholesterolemia?⁴ Should we now consider therapy with acetylsalicylic acid in men with transient ischemic attacks?⁵ If we see such patients, yet have not asked ourselves these questions, we may not simply be behind in our reading; we may be falling short in our clinical practice.

How can busy clinicians meet this challenge to recognize and respond

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to the need to change their clinical practice? The current strategies include continuing education, recertification and the like. The strategy that is the focus of this series of Clinical Epidemiology Rounds is reading clinical journals.

Why do we read clinical journals?

There are many reasons why we read clinical journals; 10 are listed in Table I. Most of them are not pertinent to the topic of these rounds and will be disposed of quickly.

First, of course, is journal reading, or at least journal "flashing", to impress others. The audience can be either lay people (fellow travelers on public transport, relatives etc.) or fellow clinicians (at lunch, on rounds, at continuing education seminars etc.). The former are impressed by our erudition and the latter by our apparent ability to keep up.

Second, we read journals to keep abreast of professional news; many journals (including *CMAJ*) serve in part as house organs for our professional organizations and therefore serve to keep us informed of the actions of these organizations and of our colleagues.

Third, we sometimes read journals to better understand new, often exciting, insights into the pathobiology of the clinical problems we encounter in our practices.

Fourth, we often read journals to find out how a seasoned and widely respected clinician works up or treats a specific illness, especially if the illness is one that we don't encounter often enough to want to decide for ourselves on the value of these clinical maneuvers. Of course, we give up more than clinical judgement when we let an authority tell us how to manage our patients. We also usually give up the opportunity to look at the clinical evidence to see whether it is both valid and applicable to our practice.

Fifth, we read clinical journals to find out whether a new or existing diagnostic test will improve the accuracy, comfort, safety or efficiency with which we work up our patients.

Sixth, we read these journals to

learn more about the clinical course and prognosis of the disorders we encounter. The disorder might be a well known one whose course and prognosis are now changing or becoming more clear. Alternatively, it might be a "new" disorder, like Legionnaires' disease. After this reading we can decide whether any intervention is warranted and can do a better job of reassuring and counselling our patients and palliating their illnesses.

Seventh, we read clinical journals to determine etiology and causation, both to better advise our patients whether, for example, lifestyle attributes such as obesity, lack of exercise and job stress really constitute health risks, and to better protect our patients from the adverse effects of drugs and other clinical maneuvers.

Eighth, we read journals so that we can distinguish the preventive, therapeutic and rehabilitative maneuvers that really do benefit patients from those that either simply waste their (and our) time and money or actually generate more harm than good.

Ninth, we read clinical journals to understand the "new wave" of claims, judgements and threats about health needs, quality of care and the efficiency of clinical and other health care.*

Finally, we read some clinical journals (especially those from Britain) to be titillated by the letters to the editor. After being called a snail in a letter to the *Lancet*,[†] one

*The volume and importance of this new wave is so great that we shall devote a series of Clinical Epidemiology Rounds to it. Stay tuned.

of this series' authors is convinced that the offended British general practitioner has no equal in the articulation of outrage.

Reasons 5 to 8 in Table I constitute the essence of sensing and responding to the need to change our approach to diagnosis, prognosis, etiology and therapeutics, and will be the focus of this series of five Clinical Epidemiology Rounds.

The strategies we shall suggest assume that clinical readers are already behind in their reading and that they will never have more time to read than they do now. For this reason, and because the guides that follow call for closer attention to "Materials and methods" and other matters that often appear in small type, many of the guides recommend tossing an article aside as not worth reading, usually on the basis of quite preliminary evidence. It is only through the early rejection of *most* articles that busy clinicians can focus on the *few* that are both valid and applicable in their own practices.

The first four guides

Fig. 1, a flowchart of guides for reading articles in clinical journals, shows that the first four guides, which follow, are common to all the reasons for reading them.

Look at the title

Is the article potentially interesting or possibly useful in your practice? If not, reject it and go on to the next article, to some other task or to the hockey rink.

Review the list of authors

In addition to occasionally rec-

Table I—Ten reasons to read clinical journals

1. To impress others
2. To keep abreast of professional news
3. To understand pathobiology
4. To find out how a seasoned clinician handles a particular problem
5. To find out whether to use a new or existing diagnostic test on your patients*
6. To learn the clinical features and course of a disorder*
7. To determine etiology or causation*
8. To distinguish useful from useless or even harmful therapy*
9. To sort out claims concerning the need for and the use, quality and cost-effectiveness of clinical and other health care†
10. To be titillated by the letters to the editor

*Reasons covered in detail in this series of Clinical Epidemiology Rounds.

†A later series of Clinical Epidemiology Rounds will attempt to demystify the articles read for this reason.

ognizing a former classmate, the seasoned reader will know the track record of many authors. If this track record is one of careful and thoughtful work that has stood the test of time, read on. If, on the other hand, the track record is a series of unsupported conclusions that remain in vogue only until the letters to the editor catch up with them or indicate a repeated prejudice in search of supporting data, reject the article. However, many authors will be new or otherwise unknown, and, like the work of unknown sculptors, that of unknown authors deserves at least the following passing glances.

Read the summary

The objective here is simply to decide whether the conclusion, if valid, would be important to you as a clinician. At issue here is not whether the article's results are true (for you can rarely tell this by reading an abstract*), but whether the results, if true, are useful.

Those who have been reading

clinical journals for some time will recall that their format has changed substantially over the years. The old "Summary and conclusions" section that used to tag along at the end of articles moved to the front and became an abstract in the late 1960s in the *Lancet*, the *New England Journal of Medicine* and the *British Medical Journal*, following the lead set earlier by the *Journal of the American Medical Association* and *CMAJ*. This revised format has made the quick study of medical articles much easier for the busy clinician.

Consider the site

Is the site of the study sufficiently similar to yours that the study's results, if valid, would apply to patients in your practice?† There are two issues here. First, is your access to the required facilities, expertise and technology sufficient to permit you to implement the maneuvers described in the article? Second, are the patients at the facility where the article originated likely

to be similar to your patients in severity of their disease, treatment, age, sex, race or other key features that have an important bearing on clinical outcome?

Put another way, are the results readily transferable to your own clinical practice? For example, if you are a family physician seeing primary care patients, the results of studies carried out in specialty clinics at tertiary referral centres may not apply. This is not reverse snobbery. Consider hypertension: for years, primary care clinicians have been urged by tertiary care nephrologists to carry out rapid-sequence intravenous pyelography, endocrine work-ups and other extensive laboratory tests on newly detected hypertensive patients to detect those who could be cured.⁷ One reason for this recommendation was the appreciable yield of surgically correctable hypertension from the extensive investigation of hypertensive patients referred to tertiary care centres. An example of this yield is found in Table II: 6% of hypertensives referred to the Cleveland Clinic were found to have surgically curable disease;⁸ however, when a similar set of laboratory studies were carried out among hypertensive patients in an Ontario general practice, only about one tenth as much surgically curable hypertension was found.⁹

Both conclusions are right. Their difference arises from the referral "filters" through which general practice patients must pass before they get to tertiary care centres like the Cleveland Clinic. General practitioners preferentially refer, and tertiary care centres preferentially accept, patients with a relatively high likelihood of secondary hypertension. Thus, patients with subcostal bruits or low serum potassium concentrations travel to ter-

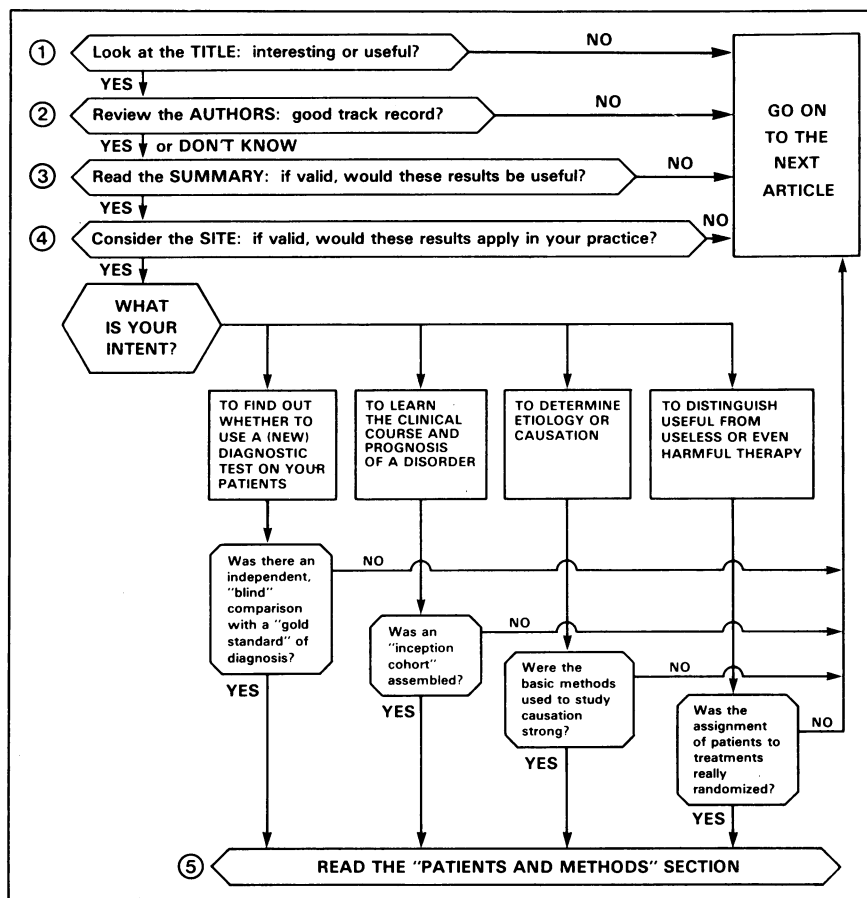


FIG. 1—The first steps in how to read articles in a clinical journal.

*Sometimes, of course, you can't even tell whether the results are true after you've read the entire article.

†We shall return to this consideration in later rounds. For now, one useful way to consider this guide is to phrase it in its negative form: Is the site so dissimilar to your own that its results, even if they are valid, would not apply in your practice?

tiary care centres and give them their high rates of curable hypertension; most patients without these features stay home. Because of these referral filters, different diagnostic tests are and should be carried out in primary and tertiary care centres. It is only by paying attention to the site where a reported study was carried out that we shall reduce the misapplication of its results.

The parting of the ways

Thus we must view published experience critically (if not biblically), for too often the "Conclusion" giveth, but the "Materials and Methods" taketh away.¹⁰

The review and editorial policies of even the best and most highly respected journals provide incomplete protection from error, and a single subscription can provide both truth and a carnival of bias. Accordingly, we know of no alternative for clinical readers (once they are satisfied with the title, authors, summary and site) but to invest time early, reviewing the Methods section of an article, so as to avoid wasting time and money later in the execution of useless or even harmful clinical procedures.

Time and again during the course of these rounds we shall see that the hasty clinician who accepts the conclusions of an article after reading only its summary does so at considerable risk both to truth and to patients. Thus, although reading an article's summary can sometimes tell you that it is *invalid* (for example, when it has based the ef-

ficacy of a risky regimen on the testimonials of its survivors), such an inspection can almost never tell you whether any article is *valid*. This latter, crucial judgement calls for bringing that particular combination of healthy scepticism and applied common sense that Ernest Hemingway labelled "crap detection" to bear on the Methods section of the article.

The guides branch at this point, depending upon the clinical reader's intent; this arborization is shown in Fig. 1. The next in this series of Clinical Epidemiology Rounds will consider guides to use when reading a clinical journal in order to decide whether to use a specific diagnostic test.

References

1. WARREN KS (ed): Qualitative aspects of the biomedical literature. In *Coping with the Biomedical Literature*. Praeger, New York (in press)
2. PRICE DS: The development and structure of the biomedical literature. *Ibid*
3. SACKETT DL, HAYNES RB, GIBSON ES, HACKETT BC, TAYLOR DW, ROBERTS RS, JOHNSON AL: Randomised clinical trial for improving medication compliance in primary hypertension. *Lancet* 1975; 1: 1205-1208
4. OLIVER MF, HEADY JA, MORRIS JN, COOPER J: A co-operative trial in the primary prevention of ischaemic heart disease using clofibrate. Report from the Committee of Principal Investigators. *Br Heart J* 1978; 40: 1069-1118
5. Canadian Cooperative Study Group: A randomized trial of aspirin and sulfinpyrazone in threatened stroke. *N Engl J Med* 1978; 299: 53-59
6. HART JT: Screening for hyperten-

sion (C). *Lancet* 1974; 2: 1380-1381

7. MELBY JC: Extensive hypertensive work-up: pro. *JAMA* 1975; 231: 399-401
8. GIFFORD RW JR: Evaluation of the hypertensive patient with emphasis on detecting curable causes. *Milbank Mem Fund Q* 1969; 47 (pt 2): 170-186
9. RUDNICK KV, SACKETT DL, HIRST S, HOLMES C: Hypertension in a family practice. *Can Med Assoc J* 1977; 117: 492-497
10. SPODICK DH: On experts and expertise: the effect of variability in observer performance. *Am J Cardiol* 1975; 36: 529-596

BOOKS

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EVALUATING HOSPITAL-BASED AMBULATORY CARE. A Case Study. William C. Stratmann and Ralph Ullman. 177 pp. Illust. Lexington Books, Lexington, Massachusetts; D.C. Heath Canada Ltd., Toronto, 1980. \$27.95. ISBN 0-669-02096-6

EVALUATION OF QUALITY OF CARE IN PSYCHIATRY. Edited by A.G. Awad, H.B. Durost and W.O. McCormick. 123 pp. Illust. Pergamon Press, Toronto, 1980. Price not stated. ISBN 0-08-025364-4

HEALTH PROTECTION AND DRUG LAWS. Published by authority of the Minister of National Health and Welfare, Educational Services, Health Protection Branch. 43 pp. Illust. Health and Welfare Canada, Ottawa, 1980. \$2.95 (Can.), paperbound. ISBN 0-660-10264-1; catalogue number H495/1980E

NEUROLOGICAL CLINICAL PHARMACOLOGY. Mervyn J. Eadie and John H. Tyrer. 470 pp. Illust. ADIS Press U.S.A., Inc., New York, 1980. \$47.50. ISBN 0-909337-07-1

THE NEW DRINKERS. Teenage Use and Abuse of Alcohol. 2nd ed. Reginald G. Smart. 180 pp. Illust. Addiction Research Foundation, Toronto, 1980. \$5.95 (Can.), paperbound. ISBN 0-88868-043-0

PHARMANUAL 1. A Comprehensive Guide to the Therapeutic Use of Cefsulodin. 94 pp. Illust. S. Karger AG, Basel, 1980. \$14.50, paperbound. ISBN 3-8055-1042-X

THE PRACTICAL MANAGEMENT OF THE DEVELOPMENTALLY DISABLED CHILD. Albert P. Sheiner and Israel F. Abrams. 461 pp. Illust. The C.V. Mosby Company, Saint Louis, 1980. \$47.50 (Can.). ISBN 0-8016-0061-8

PROGRESS IN CANCER RESEARCH AND THERAPY. Volume 13. Colorectal Cancer: Prevention, Epidemiology, and Screening. Edited by Sidney J. Winawer, David Schottenfeld and Paul Sherlock. 410 pp. Illust. Raven Press, New York, 1980. \$39.50. ISBN 0-89004-477-3

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Table II—The effect of the study site on the frequency of surgically curable hypertension

Cause for hypertension	% of patients	
	Referred to the Cleveland Clinic ⁸ (n = 4939)	In an Ontario general practice ⁹ (n = 665)
Pheochromocytoma	0.2	0
Cushing's syndrome	0.3	0.2
Primary aldosteronism	0.4	0
Coarctation of the aorta	0.6	0.2
Renovascular disorder	4.4	0.2
Renal parenchymal disorder	5.2	4.7
Use of oral contraceptives	—	0.2
Poliomyelitis	0	0.2
Essential hypertension	88.9	94.3
Surgically curable hypertension	6.0	0.6